

DOUGLAS FIR PLYWOOD

(Seventh Edition)

COMMERCIAL STANDARD CS45-47

(Supersedes CS45-45)

Effective Date for New Production From September 15, 1947



A RECORDED VOLUNTARY STANDARD
OF THE TRADE

UNITED STATES DEPARTMENT OF COMMERCE

W. AVERELL HARRIMAN, Secretary

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COMMERCIAL STANDARD FOR DOUGLAS FIR PLYWOOD

On August 17, 1932, manufacturers, distributors, and users of Douglas fir plywood approved the adoption of standard grading rules for the guidance of the Douglas fir plywood industry. These grading rules were accepted by the trade and promulgated as Douglas Fir Plywood, Commercial Standard CS45-33. The standard was revised in 1936, 1938, 1940, 1942, and 1945.

A recommended revision submitted by the Douglas Fir Plywood Association and endorsed by the standing committee was circulated on June 5, 1947, to the trade for written acceptance. Those concerned have since accepted and approved the revised standard as shown herein.

Project Manager: J. W. MEDLEY, Commodity Standards Division
National Bureau of Standards.

Technical Adviser: V. B. PHELAN, Building Technology Division,
National Bureau of Standards.

¹ Effective July 1, 1947, the Division of Simplified Practice, organized in 1921, and the Division of Trade Standards, organized in 1927, were combined to form the Commodity Standards Division. Since their organization, both of these Divisions have assisted many industries in the development of Simplified Practice Recommendations and Commercial Standards for a wide variety of commodities. A list of previously established Commercial Standards appears herein. A list of effective Simplified Practice Recommendations may be obtained from the Commodity Standards Division, National Bureau of Standards, Washington 25, D. C.

DOUGLAS FIR PLYWOOD

(SEVENTH EDITION)

COMMERCIAL STANDARD CS45-47

PURPOSE

1. Because of the extended application of Douglas fir plywood to a large number of new uses, the following standard grading rules are offered as a universal basis of understanding in the industry. General adoption and use of this standard will facilitate procurement of the proper grade of material and the proper type as to moisture resistance for its varied uses and provide a better understanding between buyer and seller. Architects, engineers, contractors, industrial users, and home owners will thus be able to specify their needs from nationally accepted grading standards.

SCOPE

2. These rules cover five grades of Interior Type and seven grades of Exterior Type Douglas fir plywood; a laminated board for paneling, sheathing, concrete forms, cabinet work, and many other structural and industrial uses. In addition, there are included grade specifications for door panels, tests, standard sizes, size tolerances, reinspection rules, and nomenclature and definitions.

DEFINITION

3. Douglas fir plywood is a built-up board of laminated veneers in which the grain of each piece is at right angles to the one adjacent to it. The kiln-dried veneer is united under high pressure with a bonding agent, making the joints as strong as or stronger than the wood itself. The alternating direction of the grain with each contiguous layer of wood equalizes the strains and in this way minimizes shrinkage and warping of the product and prevents splitting.

GENERAL REQUIREMENTS

4. All Douglas fir plywood sold as of commercial standard quality shall meet the following general requirements.

5. *Workmanship*.—Unless otherwise specified, plywood shall be smoothly sanded on two sides. When specified rough or unsanded, plywood may have paper tape on either face or back, or both, except for the Exterior type of Industrial grade. It shall be well manufactured and free from blisters, laps, and defects, except as permitted in the specific rules for the various grades.

6. *Bonding*.—The entire area of each contacting surface of the plywood shall be bonded in an approved manner with material best adapted to each use classification.

7. *Loading or packing*.—It shall be securely loaded or packed to insure delivery in a clean and serviceable condition.

DETAIL REQUIREMENTS

8. Douglas fir plywood is made in two types, Interior (Int.) and Exterior (Ext.). It shall be graded according to both sides of the piece into the various grades as hereinafter defined. The grade descriptions set forth the minimum requirements, and therefore, the majority of panels in any shipment will exceed the specification given.

INTERIOR TYPE

9. This type represents the majority of production and consists of plywood with a high degree of moisture resistance where its application requires that it shall retain its original form and practically all its strength when occasionally subjected to a thorough wetting and subsequent normal drying, a plywood suitable for construction where subjected to occasional deposits of moisture by condensation through walls or leakage or from other sources. The following western softwood species may be used for inner plies only, in Interior Type Sound 2 Sides, Sound 1 Side, Industrial, and door panel grades only: Western hemlock, Sitka spruce, noble fir, commercial white fir, Alaskan cedar, western red cedar, California redwood, ponderosa pine, sugar pine, and western larch. Veneers $\frac{1}{2}$ in. or more shall be used in the construction of interior type panels $\frac{1}{4}$ in. and upward in thickness. The veneer thickness shall be measured before the panel is sanded. Veneer used in crossbands shall contain no knotholes greater than $2\frac{1}{2}$ in. in maximum dimension, and no pitch pocket more than 2-in. wide by 4-in. long or equivalent area if of lesser widths. This type shall meet the test requirements set forth in paragraphs 24 and 25. This type is available in the following grades:

10. *Sound 2 Sides (So2S).*—Each face shall be of one or more pieces of firm, smoothly cut veneer. When of more than one piece, it shall be well joined and reasonably matched for grain and color at the joints. It shall be free from knots, splits, pitch pockets, and other open defects. Streaks, discolorations, sapwood, shims, and neatly made patches shall be admitted. This grade shall present a smooth surface suitable for painting.

11. *Sound 1 Side (So1S).*—The face shall be of one or more pieces of firm smoothly cut veneer. When of more than one piece, it shall be well joined and reasonably matched for grain and color at the joints. It shall be free from knots, splits, pitch pockets, and other open defects. Streaks, discolorations, sapwood, shims, and neatly made patches shall be admitted. The face shall present a smooth surface suitable for painting. The back shall contain no knotholes greater than $2\frac{1}{2}$ in. in maximum dimension, no pitch pockets more than 2-in. wide by 4-in. long or equivalent area if of lesser width, no splits wider than $\frac{1}{2}$ in.; splits $\frac{1}{2}$ -in. wide at any point may be one-fourth panel length; those not more than $\frac{1}{4}$ -in. wide at any point may

be half-panel length; and those not more than $\frac{3}{16}$ -in. wide may be full-panel length. Any number of plugs, patches, shims, worm or borer holes, and other characteristics are permitted in the back provided they do not seriously impair the strength or serviceability of the panel.

12. *Sheathing (SH) (Unsanded)*.—(Scoring for nailing optional). An unsanded plywood made only in the following sizes: Thicknesses $\frac{3}{16}$ - and $\frac{1}{2}$ -inch 3-ply; $\frac{1}{2}$ - and $\frac{3}{4}$ -inch 5-ply; widths 36 and 48 inches; length 96 inches. The face may contain knotholes not larger than 1 in. in least dimension, pitch pockets not wider than 1 in., splits not wider than $\frac{3}{16}$ in., and plugs, patches, shims, and other characteristics in number and size that will not impair the serviceability of the panel and that cannot be reasonably and economically repaired to make a sound face. The back shall be of the same quality as the back for a Sound 1 Side grade, interior type, paragraph 11. No belt sanding is permissible in this grade.

13. *Industrial (Unsanded)*.—The face may contain tight knots, plugs, patches, and shims, worm or borer holes not more than $\frac{3}{16}$ -in. wide or $1\frac{1}{2}$ -in. long, knotholes not more than $\frac{3}{4}$ in. in least dimension, open pitch pockets not more than $\frac{3}{16}$ -in. wide or $1\frac{1}{2}$ -in. long, and splits not wider than $\frac{3}{16}$ in. The back may contain knotholes not larger than 1 in. in least dimension, pitch pockets not wider than 1 in., splits not wider than $\frac{3}{16}$ in., and plugs, patches, shims, and other characteristics in number and size that will not impair the serviceability of the panel and that cannot be reasonably and economically repaired to make a sound back. Cores and crossbands shall be of firm stock but shall contain no knotholes greater than 1 in. in least dimension and no open pitch pockets wider than 1 in.

14. *Concrete-form plywood*.—Concrete-form plywood shall be built up of three or five thicknesses of veneer, of which the two outside plies are at least $\frac{1}{8}$ -in. thick before sanding, except for plywood $\frac{1}{4}$ in. in thickness. An occasional knothole is permissible in the center or core of 5-ply panels only, but no knotholes are permitted in cross banding. Appearance of faces shall be similar to that of "Sound 2 Sides" grade (par. 10). All concrete-form plywood shall be so designated by grade marking each panel on the face. Concrete-form plywood shall be edge-sealed, and have the faces mill-oiled unless the order specifically states not to oil.

DOOR PANELS (Interior Type)

15. *Door panel*.—The standard thickness of 3-ply flat veneered panels shall be $\frac{1}{4}$ in. after sanding. Each face shall be of one or more pieces of firm smoothly cut veneer. When of more than one piece, it shall be well joined and reasonably matched for grain and color at the joints. It shall be free from knots, splits, pitch pockets, and other open defects. Streaks, discolorations, sapwood, shims, and neatly made patches shall be admitted.

EXTERIOR TYPE

16. This type represents the ultimate in moisture resistance, a plywood that will retain its original form and strength when repeatedly wet and dried and otherwise subjected to the elements, and suitable for permanent exterior use. It shall be free from both core gaps and core voids that impair the strength or serviceability of the panel. Only a resin-impregnated tape shall be permitted in the glue line. No veneer thicker than $\frac{3}{16}$ in. shall be used. All veneer used in Exterior type panels shall be free from knotholes more than 1 in. in least dimension, open pitch pockets wider than 1 in., worm or borer holes more than $\frac{5}{8}$ -in. wide or $1\frac{1}{2}$ -in. long and all knots unless tight and not more than $1\frac{1}{2}$ in. in least dimension. All exterior panels shall be so designated by a distinctive symbol "Ext." branded or stamped on edge of each panel. Plywood of this type shall meet the test requirements set forth in paragraphs 24, 26a, 26b, and 26c. This type is available in the following grades:

17. *Good 2 Sides Exterior (G2S-Ext.)*.—Each face shall be of a single piece of smoothly cut veneer of 100-percent heartwood, free from knots, splits, pitch pockets, and other open defects. The face shall be a yellow or pinkish color without stain. Shims that occur only at the ends of panels and inconspicuous well matched small patches not to exceed $\frac{3}{8}$ -in. wide by $2\frac{1}{2}$ -in. long shall be admitted. This grade is recommended for uses where a light stain or natural finish is desired.

18. *Good 1 Side Exterior (G1S-Ext.)*.—The face shall be equal to that described under "Good 2 Sides Exterior" grade (par. 17), while the back shall be equal to the "Sound 2 Sides Exterior" grade (par. 19).

19. *Sound 2 Sides Exterior (So2S-Ext.)*.—Each face shall be of one or more pieces of firm, smoothly cut veneer. When of more than one piece, it shall be well joined and reasonably matched for grain and color at the joints. It shall be free from knots, splits, pitch pockets, and other open defects. Streaks, discolorations, sapwood, shims, and neatly made patches shall be admitted. This grade shall present a smooth surface suitable for painting.

20. *Sound 1 Side Exterior (So1S-Ext.)*.—The face shall be of one or more pieces of firm, smoothly cut veneer. When of more than one piece, it shall be well joined and reasonably matched for grain and color at the joints. It shall be free from knots, splits, pitch pockets, and other open defects. Streaks, discolorations, sapwood, shims, and neatly made patches shall be admitted. The face on this grade shall present a smooth surface suitable for painting. The back may contain knotholes not larger than 1 in. in least dimension, pitch pockets not wider than 1 in., splits not wider than $\frac{3}{16}$ in., and pluts, patches, shims, and other characteristics in number and size that will not impair the serviceability of the panel and that cannot be reasonably and economically repaired to make a sound face.

21. *Sheathing Exterior (SH-Ext.) (Unsanded)*.—An unsanded panel made only in $\frac{1}{16}$ in., $\frac{3}{16}$ in., $\frac{1}{2}$ in., and $\frac{5}{8}$ in. thicknesses and in one standard panel size 48 in. by 96 in. Both face and back of this grade shall be of the same quality as the back of a Sound 1 Side Exterior panel, described in paragraph 20. No belt sanding is permissible.

22. *Industrial Exterior*.—This grade shall have the same quality of face and back veneer as specified for Industrial (Interior type), as described in paragraph 13. Panels in this grade shall be lightly "touch-sanded" on both sides where necessary to remove tape or surplus glue, but the $\frac{1}{32}$ -in. tolerance as allowed for unsanded panels shall apply.

23. *Concrete-form Exterior*.—Concrete-form Exterior plywood shall be the same as "Sound 2 Sides Exterior" (par. 19), except that faces shall be $\frac{1}{8}$ -in. thick before sanding. It is made only in $\frac{1}{2}$ -in. and $\frac{3}{4}$ -in. thicknesses. All concrete-form plywood shall be so designated by grade marking each panel on the face. Concrete-form plywood shall be edge-sealed, and have the faces mill-oiled unless the order specifically states not to oil.

TESTS

24. *Sampling*.—Samples for testing shall be taken from one percent of the panels in any shipment, but not less than 5 and not more than 10 panels shall be selected. From each panel selected a test piece shall be cut from each end, approximately at midwidth of the panel, and from each edge approximately at midlength of the panel, while a fifth piece shall be cut from somewhere near the middle or center of the panel.

25. *Test for interior type*.—One test sample 6 in. by 6 in. shall be taken from each test piece. They shall be submerged in water at room temperature for a period of 4 hr, followed by drying at a temperature not to exceed 100 deg. F for a period of 20 hr. This cycle shall be repeated until all samples have failed. More than 2 in. of delamination along the edge of a sample shall be considered as failure. The average number of cycles which the five samples from one panel shall withstand is ten, or that specific panel shall be rejected.

26. *Test for Exterior Type*.

26a. *Cold soaking test*.—Five shear specimens shall be cut as shown in figure 1 from each test piece. They shall be submerged in water at room temperature for a period of 48 hr and dried for 8 hr at a temperature of 145° F ($\pm 5^\circ$ F) and then followed by two cycles of soaking for 16 hr and drying for 8 hr under the conditions described above. The shear specimens shall again be soaked for a period of 16 hr and tested while wet in a shear testing device as illustrated in figure 2, by placing them in the jaws of the device to which a load shall be applied at the rate of 600 to 1,000 lb a minute until failure. The shear specimens must show no less than 30 percent minimum and 60 percent average

wood failure and no delamination. If the number of plies exceeds 3, the cuts shall be made so as to test any two of the joints, but the additional plies need not be stripped except as demanded by the limitations of the width of the retaining jaws on the testing device. When desired, special jaws may be constructed to accommodate the thicker plywood. If the number of plies exceeds 3, the choice of joints to be tested shall be left to the discretion of the inspector, but at least one-half the tests shall include the innermost joints.

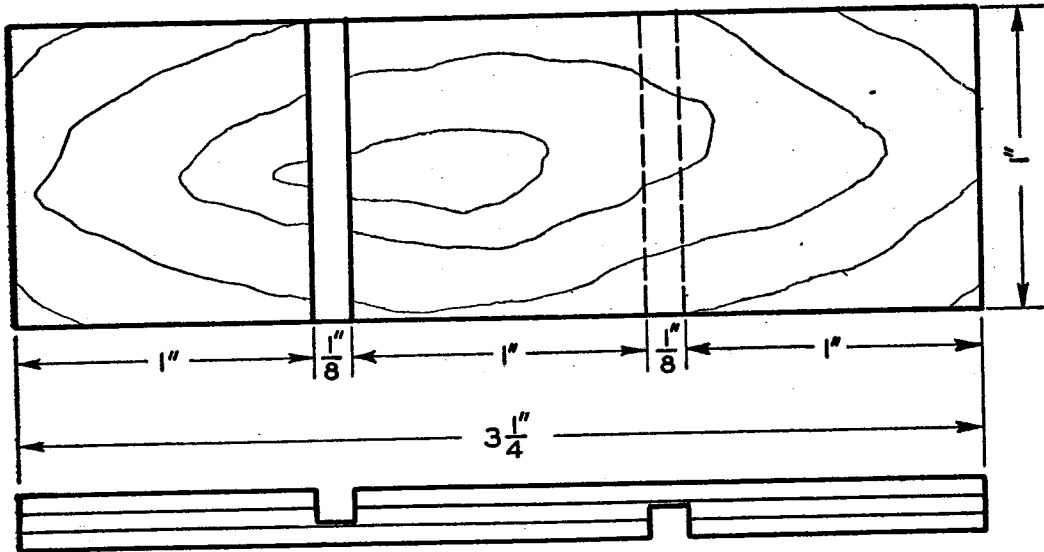


FIGURE 1.—Shear specimen.

26b. *Boiling test.*—Take shear specimens as described in paragraph 26a, boiling them, in water for 4 hr, followed by a drying of 20 hr at a temperature of 145° F ($\pm 5^\circ$ F). They shall be boiled again for a period of 4 hr and the shear specimens tested while wet, as described in paragraph 26a. The shear specimens must show no less than 30 percent minimum and 60 percent average wood failure, and no delamination.

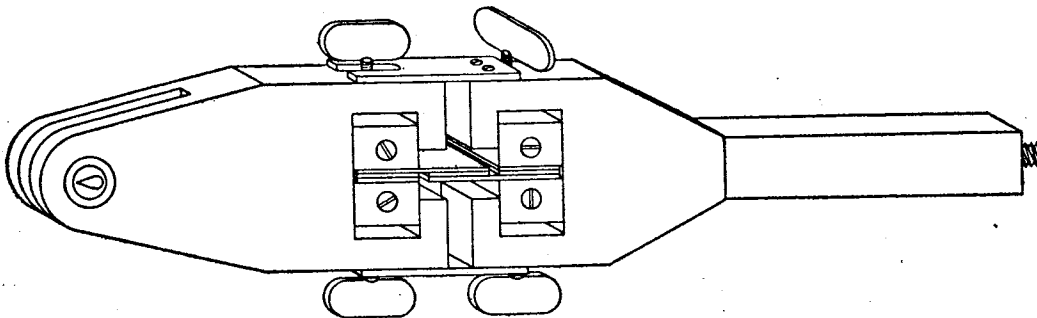


FIGURE 2.—Jaws for shear test.

26c. *Fire test.*—A $5\frac{1}{2}$ in. by 8 in. piece shall be taken from each selected test panel and shall be placed on the stand as illustrated in figure 3 and subjected to a 800° to 900° C flame from a Bunsen-type burner for a period of 10 min. or, in the case of a thin specimen, until a brown char area appears on the back side. The burner shall be equipped with a wing top to envelop the entire width of the specimen in flame. The top of the burner shall be 1 in. from the specimen face and the flame $1\frac{1}{2}$ -in. high. The flame shall impinge on the face of the specimen 2 in. from the bottom end. After the test the sample shall be removed from the stand and the glue lines examined for delamination by separating the charred plies with a sharp chisel-like instrument. Any delamination due to combustion shall be considered as failure.

27. *Interpretation of tests.*—If there is failure of more than one test piece from any Exterior panel, that specific panel shall be rejected. If there is a failure in any of the panels (Exterior or Interior) tested, five additional panels shall be selected and tested under the conditions described. All five panels of this second set must pass the required test.

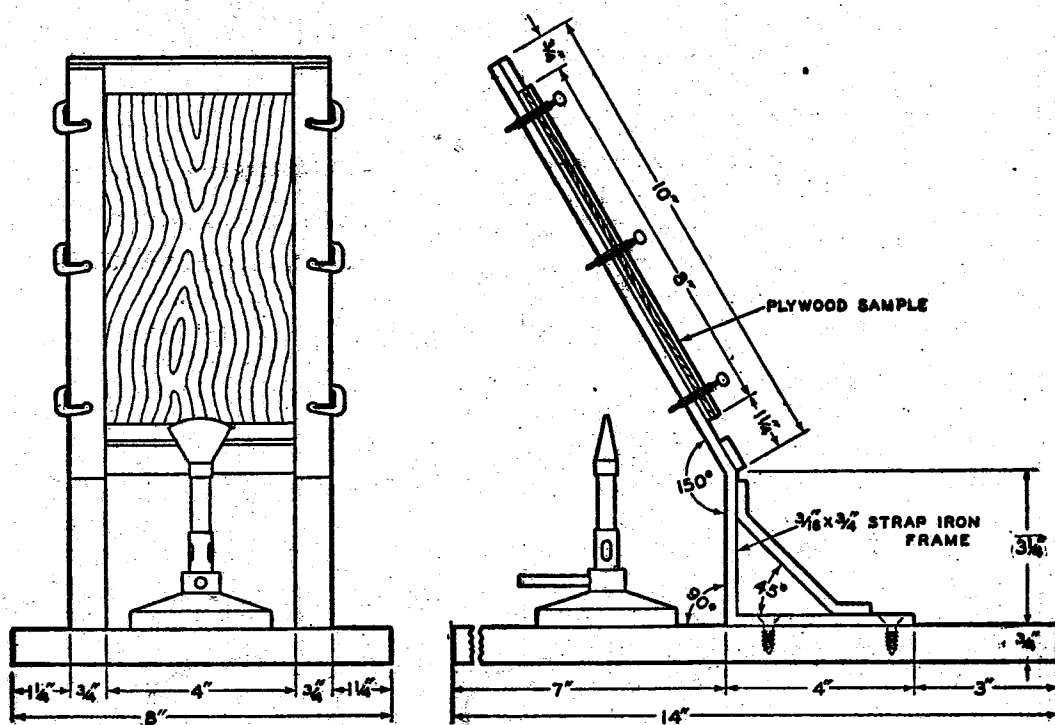


FIGURE 3.—Apparatus for fire test.

STANDARD SIZES

28. Douglas fir plywood is made in the following standard sizes.

TABLE 1. Standard Douglas fir plywood sizes

Item	Width	Length	Thickness
Interior Type			
Standard panels (So2S) (So1S).	Inches 24 30 36 48	Inches 60 72 84 96	Inches 1/8 (3-ply; sanded 2 sides). 3/16 (3-ply; sanded 2 sides). 1/4 (3-ply; sanded 2 sides). 5/16 (3-ply; sanded 2 sides). 1/2 (5-ply; sanded 2 sides). 5/8 (5-ply; sanded 2 sides). 3/4 (5-ply; sanded 2 sides).
Sheathing.	36 48	96	5/16 (3-ply; unsanded). 3/8 (3-ply; unsanded). 1/2 (3- or 5-ply; unsanded). 5/8 (3- or 5-ply; unsanded).
Industrial.	As ordered up to 48.	As ordered up to 96.	1/4 (3-ply; unsanded). 5/16 (3-ply; unsanded). 3/8 (3-ply; unsanded). 1/2 (5-ply; unsanded). 5/16 (5-ply; unsanded). 3/8 (5-ply; unsanded). 1 1/16 (5-ply; unsanded). 3/4 (5-ply; unsanded). 7/8 (5-ply; unsanded). 7/8 (7-ply; unsanded).
Concrete-form panels.	36 48	60 72 84 96	1/4 (3-ply; sanded 2 sides). 1/2 (5-ply; sanded 2 sides). 5/16 (5-ply; sanded 2 sides). 3/8 (5-ply; sanded 2 sides). 3/4 (5-ply; sanded 2 sides).
Exterior Type ¹			
Standard panels. (G2S-Ext.) (G1S-Ext.) (So2S-Ext.) (So1S-Ext.)	12 14 16 18 20 22 24 26 28 30 36 42 48	48 60 72 84 96	3/16 (3-ply; sanded 2 sides). 1/4 (3-ply; sanded 2 sides). 5/16 (3-ply; sanded 2 sides). 3/8 (3-ply; sanded 2 sides). 7/16 (5-ply; sanded 2 sides). 1/2 (5-ply; sanded 2 sides). 5/16 (5-ply; sanded 2 sides). 3/8 (5-ply; sanded 2 sides). 1 1/16 (5-ply; sanded 2 sides). 3/4 (5-ply; sanded 2 sides). 13/16 (5-ply; sanded 2 sides). 7/8 (7-ply; sanded 2 sides). 15/16 (7-ply; sanded 2 sides). 1 (7-ply; sanded 2 sides). 1 1/16 (7-ply; sanded 2 sides). 1 1/8 (7-ply; sanded 2 sides). 1 3/16 (7-ply; sanded 2 sides).
Sheathing, exterior.	48	96	5/16 (3-ply; unsanded). 3/8 (3-ply; unsanded). 1/2 (3-ply; unsanded). 5/8 (3-ply; unsanded).
Industrial, exterior.	As ordered.	As ordered.	1/4 (3-ply; unsanded). 5/16 (3-ply; unsanded). 3/8 (3-ply; unsanded). 7/16 (3-ply; unsanded). 1/2 (5-ply; unsanded). 5/16 (5-ply; unsanded). 3/8 (5-ply; unsanded). 1 1/16 (5-ply; unsanded). 3/4 (5-ply; unsanded). 7/8 (5-ply; unsanded).
Concrete-form panels, exterior.	Same as standard panels.	Same as standard panels.	5/8 (3-ply; sanded 2 sides). 3/4 (5-ply; sanded 2 sides).

¹ Number of plies listed under thickness is minimum.

SIZE TOLERANCES

29. A tolerance of $\frac{1}{64}$ (0.0156) in. over or under the specified thickness shall be allowed on sanded panels and a tolerance of $\frac{1}{32}$ (0.0312) in. on unsanded panels.

30. A tolerance of $\frac{1}{32}$ (0.0312) in. over or under the specified length and/or width shall be allowed but all panels shall be square within $\frac{1}{8}$ (0.1250) in.

INSPECTION

31. All plywood guaranteed to conform to the commercial standard grading rules is sold subject to inspection in the white only, except concrete-form material which may have a priming of oil or other preparation before shipment. All complaints regarding the quality of any shipment must be made within 15 days from receipt thereof.

32. If the grade of any plywood shipment is in dispute and a reinspection is demanded, the cost of such reinspection shall be borne by the seller and the shipment settled for on the basis of the reinspection report if the shipment is more than 5 percent below grade, or if it contains more than 1 percent of mismanufactured panels containing defects such as short core, lapped core, blisters, delamination, etc., which render the panel unfit for normal use. The buyer need accept no such defective panels shipped as any standard grade listed in this commercial standard.

33. If reinspection establishes the shipment to be 5 percent or less below grade, and to contain 1 percent or less of mismanufactured panels, the buyer pays the cost of reinspection and pays for the shipment as invoiced.

GRADE MARKING AND CERTIFICATION

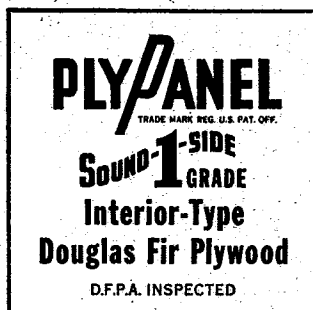
34. In order to assure the purchaser that he is getting Douglas fir plywood of the grade specified, producers may individually or in concert with their trade association or inspection bureau, issue certificates with each shipment; or grade mark each panel as conforming to the standard.

35. The following sets forth the grade marking and certification rules adopted by the Douglas Fir Plywood Association to preserve the high standards of quality herein recorded and to insure distributors and ultimate consumers receiving the proper kind of plywood for their specific needs. All standard size panels are stamped or branded with the following symbols:

(a) *Sound 2 Sides* grade is stamped or branded on one edge.

PLYPANEL D.F.P.A. — S_o2S

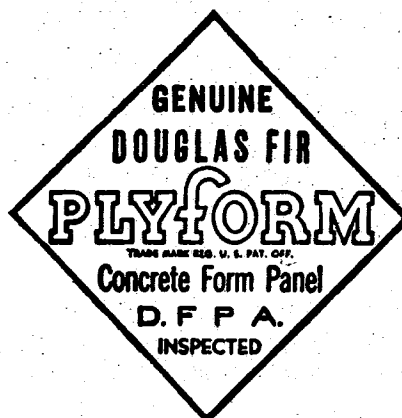
(b) *Sound 1 Side* grade is stamped on the back.



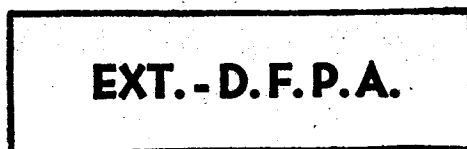
(c) *Sheathing* is scored in parallel lines at 16-in. intervals across the face, with the name "PLYSCORD" repeated at frequent intervals, and also stamped in the corner of the panel.



(d) *Concrete-form panels* are stamped on the face.



(e) *All Exterior-type plywood* is stamped or branded on the edge.



36. The Douglas Fir Plywood Association maintains an Inspection Bureau for the careful grading of its members' products. By the use of certificates on carload lots, the first unloading buyer of a carload is assured of receiving plywood of the grade specified. This is of special value to buyers of industrial grade plywood which, because of frequent odd sizes, cannot be grade marked separately.

Certificate of Inspection

IT IS HEREBY CERTIFIED that the plywood identified below and marked with a grademark of the DOUGLAS FIR PLYWOOD ASSOCIATION (D.F.P.A.), was manufactured in accordance with the grade specifications established by the U. S. Department of Commerce as Commercial Standard CS45-47, by the

JOHN DOE PLYWOOD COMPANY

whose production bearing any of the Association grademarks is under the supervision of the Inspection Department of the DOUGLAS FIR PLYWOOD ASSOCIATION.

Signed for DOUGLAS FIR PLYWOOD ASSOCIATION

Order No. _____

Car No. _____

Date _____

Charles E. Devlin
Managing Director

Authorized Signatory

Subscribed and declared to before me, the undersigned, a Notary Public in and for the state of _____ by the above named authorized signatory personally known to me as the person signing the above certificate.

Notary Public

Dated _____ 19____

THE DOUGLAS FIR PLYWOOD ASSOCIATION
CORPORATE SEAL
TACOMA, WASH.

PLYFORM
Douglas Fir Plywood

PLYANEL
Douglas Fir Plywood

PLYWOOD BEFA - 5025

EXT. - D.F.P.A.

PLYWOOD SHEATHING
D.F.P.A.

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FIGURE 4.—Inspection certificate of the Douglas Fir Plywood Association

NOMENCLATURE AND DEFINITIONS

Back.—The side reverse to the face of the panel.

Borer holes.—Voids made by wood-boring insects or worms.

Centers.—See cores.

Checks.—Small splits running parallel to the grain of the wood caused chiefly by strains produced in seasoning.

Cores.—Cores or centers are the innermost layer in plywood construction.

Crossbanding.—Veneer used in the construction of plywood with five or more plies. In 5-ply construction it is placed at right angles between the core and faces.

Defects, open.—Checks, splits, open joints, cracks, loose knots, and other defects interrupting the smooth continuity of the panel surface.

Face.—The better side of a panel in any grade calling for a face and a back; also, either side of a panel where the grading rules draw no distinction between faces.

Heartwood.—The darker-colored wood occurring in the inner portion of the tree, sometimes referred to as "heart".

Knots.—Cross section of a branch or limb whose grain usually runs at right angles to that of the piece in which it is found.

Knotholes.—Voids produced by the dropping of knots from the wood in which they were originally embedded.

Lap.—A condition where the veneers used are so misplaced that one piece overlaps the other rather than making a smooth butt joint.

Patches.—Insertions of sound wood glued and placed into panels from which defective portions have been removed.

Pitch Pockets.—A pitch pocket is a well defined opening between rings of annual growth, usually containing, or which has contained, more or less pitch, either solid or liquid.

Pitch streaks.—A pitch streak is a well defined accumulation of pitch in a more or less regular streak.

Sapwood.—The lighter-colored wood occurring in the outer portion of the tree, sometimes referred to as "sap."

Shim.—A long, narrow patch not more than $\frac{1}{16}$ -in. wide.

Streaks.—See pitch streaks.

METHOD OF ORDERING

37. The established procedure in specifying size and grade of plywood is to name the number of plies, width, length, grade, moisture resistance, finished thickness, and whether sanded or unsanded.

38. Width always refers to distance across the grain of the face plies; length refers to the distance along the grain. Width should always be specified first.

39. If, for example, you require 100 pieces of plywood $\frac{1}{4}$ -in. thick, 48-in. wide, and 96-in. long, for interior or semiexposed conditions, one side of which is to be nailed against a wall where it will not show, but the other side is to be exposed to view and painted, this material should be ordered as follows:

Douglas Fir Plywood: 100 pcs., 3-ply 48 in. by 96 in., Sound 1 Side Grade, Interior Type, Sanded 2 Sides to $\frac{1}{4}$ -in. thickness.

40. For most uses, sanded panels are desirable, but there are occasional uses where unsanded panels, of a "Sound" or other grade, are satisfactory. Such panels should be specified unsanded.

41. For special types of service, special features may be desirable in plywood panels, such as omission of oiling for concrete-form panels; extra thick faces for certain architectural treatments, etc. In such cases, the special treatment or feature should be stated after the standard specification. For example, a "Standard Sound 2 Sides" panel of $\frac{3}{8}$ -in. thickness is desired for permanent exterior use. The order should read:

Douglas Fir Plywood: 100 pcs., 3-ply 48 in. by 96 in., Sound 2 Sides Grade, Exterior, Sanded 2 Sides to $\frac{3}{8}$ -in. thickness.
(Add further special requirements.)

GRADE USE CLASSIFICATION FOR DOUGLAS FIR PLYWOOD

42. The following chart is offered by the Douglas Fir Plywood Association, as a rough guide to the grades generally suitable to the various uses listed. Where the material is to be exposed to the weather, plywood of "Exterior" type should be specified.

Use	Types		Grades						
	Interior	Exterior for permanent exposure to weather	Good 2 sides (exterior only)	Good 1 side (exterior only)	Sound 2 sides	Sound 1 side	Concrete-form panels	Sheathing	Industrial stock
Amusement-park devices.....	X	X			X	X			
Archways.....	X	X			X	X			
Auto body parts.....	X	X			X	X			X
Auto trailers.....	X	X	X		X	X			X
Base molding.....	X					X			
Benches.....		X			X				
Billboards.....		X			X	X			
Bins.....	X	X			X	X			
Birdhouses.....		X			X	X			
Boats.....		X	X	X	X	X			
Bookcases.....	X				X				
Boxes, trays, etc.....	X				X				
Breakfast nooks.....	X				X	X			
Bulletin boards.....	X					X			
Cabinets:									
General.....	X				X				
Ice cream.....	X				X				
Kitchen.....	X				X				
Medicine.....	X				X				
Ceilings.....	X					X			
Chests.....	X				X				
Church pews.....	X				X				
Closets.....	X					X			
Clothes chutes.....	X					X			
Concrete forms.....	X	X					X		
Counter fronts.....	X				X	X			
Desks.....	X				X	X			
Display racks.....	X				X				
Drawers and bottoms.....	X				X				
Farm buildings.....	X	X			X	X		X	
Fixtures, store.....	X				X				
Flooring.....	X					X			
Flower boxes.....		X			X				
Furniture.....	X	X	X	X	X				
Garages.....	X	X			X	X		X	
Houses, play.....	X	X				X	X		
Ironing boards.....	X				X				
Lockers.....	X				X				
Manual training uses.....	X	X	X	X	X	X	X		
Marine applications.....		X	X	X	X	X			
Mirror backs.....	X					X			X
Paneling.....	X	X		X		X			
Partitions.....	X				X				
Picnic tables.....		X			X	X			
Radio cabinets.....	X								X
Refrigerators.....		X			X	X			X
Screens (folding).....	X				X				
Sheathing.....	X							X	
Shelving.....	X				X	X			
Siding.....		X			X	X			
Signs.....	X	X		X	X				
Subflooring.....	X							X	
Sun room porch.....	X					X			
Table tops.....	X	X		X		X			
Toys.....	X	X		X	X				
Trailers.....	X	X			X	X			
Trench sheeting.....	X	X					X		
Trunks.....	X				X				
Wardrobes.....	X				X				
Walls.....	X					X			
Window displays.....	X				X	X			
Window seats.....	X				X	X			
Window valances.....	X				X	X			
Work benches.....	X	X			X	X			

STANDING COMMITTEE

43. The following individuals comprise the membership of the standing committee, which is to review, prior to circulation for acceptance, revisions proposed to keep the standard abreast of progress. Each organization nominated its own representative. Comment concerning the standard and suggestions for revision may be addressed to any member of the committee or to the Commodity Standards Division, National Bureau of Standards, which acts as secretary for the committee.

CRAIG SPENCER (chairman), Elliott Bay Mill Co., 600 West Spokane Street, Seattle, Wash.

NELSON S. PERKINS, Douglas Fir Plywood Association, Tacoma Building, Tacoma 2, Wash.

NORMAN O. CRUVER, The Wheeler, Osgood Co., 1216 St. Paul Avenue, Tacoma 1, Wash.

CHARLES W. JACOB, John Bader Lumber Co., 2020 Clybourne Avenue, Chicago, Ill.

ARNOLD KOUTONEN, Associated Plywood Mills, Foot of Jefferson Street, Olympia, Wash.

HARRY H. STEIDLE, Prefabricated Home Manufacturers' Institute, 908 Twentieth Street NW., Washington 6, D. C.

RALPH R. BRITTON, National Housing Agency, Room 3-119, Tempo E Building, Washington 25, D. C.

C. O. CHRISTENSON, Property Requirements Section, National Housing Agency, Federal Housing Administration, Washington 25, D. C.

HISTORY OF PROJECT

44. Pursuant to a request from the manufacturers of Douglas fir plywood, a general conference of manufacturers, distributors, and users of the product was held at the Winthrop Hotel, Tacoma, Wash., on August 17, 1932, to consider the adoption of standard grading rules for the guidance of the industry. Manufacturers representing approximately 80 percent of the production of Douglas fir plywood were in attendance, as well as others interested in the distribution and use of the product. The proposed standard tentatively drafted by a committee of manufacturers was thoroughly discussed and several constructive changes were made. Following written acceptance by a satisfactory majority, the standard was promulgated as CS45-33, effective February 15, 1933.

FIRST REVISION

45. The standing committee as a result of an industry conference held in Tacoma, Washington, on August 3, 1936, recommended some modifications. The recommended revision was circulated on September 11, 1936, for written acceptance with the result that the revised standard was accepted and authorized by the industry for publication as Douglas Fir Plywood (Domestic Grades) (Second Edition), Commercial Standard CS45-36, effective November 1, 1936.

SECOND REVISION

46. Agreeable to a suggestion from the Federal Housing Administration, and following several conferences between representatives of the Forest Products Laboratory, the FHA and the plywood manu-

facturers, a second revision, so as to provide for two classes of moisture resistance and changes in the sheathing grade, was proposed. On approval by the standing committee, this revision was circulated September 16, 1938, for acceptance. Following acceptance by a satisfactory majority, the success of the revision was announced on October 25, 1938, and the standard became effective for new production on November 10, 1938, as CS45-38.

THIRD REVISION

47. A general demand for the various grades of Douglas fir plywood as manufactured for permanent exterior use, led to the submission of a proposed revision by the Douglas Fir Plywood Association, to include detail requirements in the standard for seven distinct grades of the Exterior Type. Upon approval by the standing committee, the recommended revision was submitted on May 7, 1940, to the trade for written acceptance, and the establishment of the revision was announced on July 20, 1940. The revised standard became effective for new production on August 20, 1940, as CS45-40.

FOURTH REVISION

48. Pursuant to a request from the Douglas Fir Plywood Association, dated May 27, 1942, and following approval by the standing committee, the fourth revision was circulated on July 2, 1942, to the trade for written acceptance. The purpose of this revision was to make adjustments in the moisture-resistant type, so as to speed up the production of those grades and sizes essential for defense construction needs. The major changes were the elimination of the grades "Good 2 Sides" and "Good 1 Side," the addition of a new grade "Sound 1 Side" and a considerable reduction in the number of standard panel sizes. This revision supersedes both CS45-40 (Domestic Grades) and CS45E-36 (Export Grades), since Douglas fir plywood is now graded on the same basis whether for domestic or export purposes. Following acceptance by a preponderant majority, the establishment of the revision was announced on October 30, 1942, as Commercial Standard CS45-42, effective for new production from November 16, 1942.

FIFTH REVISION

49. The result of experience gained by our armed forces in the use of plywood for various marine applications led to the development of an improved grade for such use. On June 22, 1944, the Douglas Fir Plywood Association submitted a proposed revision which was unanimously approved by the standing committee. On July 31, 1944, the recommended revision was circulated to the trade for written acceptance. Following acceptance by a satisfactory majority, the success of the revision was announced on December 27, 1944, as Commercial Standard CS45-45, effective for new production from January 27, 1945.

SIXTH REVISION

50. On April 14, 1947, the Douglas Fir Plywood Association submitted a proposed revision in which the major changes were a reduction in the number of grades; renaming Moisture-Resistant type to

Interior type; permitting the use of western hemlock, Sitka spruce, noble fir, and other western softwood species in the inner plies of Sound 2 Sides, Sound 1 Side, Industrial, and door panel grades in the Interior type only; increasing the number of cycles of the bondage test for the Interior type from two to an average of ten; and the inclusion of a fire test for Exterior type bondage. These changes were approved by the standing committee and the recommended revision was circulated on June 5, 1947, to those directly concerned for written acceptance. The success of the revision was announced on August 15, 1947, as Commercial Standard CS45-47.

EFFECTIVE DATE

51. Having been passed through the regular procedure of the Commodity Standards Division, and approved by the acceptors herein-after listed, this commercial standard was issued by the Department of Commerce, effective from September 15, 1947.

Edwin W. Ely,
Chief, Commodity Standards Division.

APPENDIX STATEMENT

Commentary on Methods of Sampling and Bondage Test

Although the sampling plan and methods of test set forth in paragraphs 24-27 of the above commercial standard are now in general use throughout the industry, it may be well to note that the whole problem of bondage tests is still under study, and that fully satisfactory criteria remain to be developed.

The determination of percentage of wood failure in particular is subject to rather erratic fluctuations. This seems to be due in part to the fact the specimen is subjected to bending as well as shearing stresses, and it seems reasonable to conclude therefore that the resulting observation may be rather heavily affected by minute variations in the depths of the notches cut in the specimen.

It is believed that the following rough analysis of the lot acceptance sampling plan specified in paragraphs 24 and 27 may prove helpful to users of the plan in evaluating the protection it affords to purchaser and manufacturer. The analysis was prepared by the Statistical Engineering Laboratory of the National Bureau of Standards. It must be viewed as only an approximation; the statistical nature of the tests is such that an exact appraisal of the sampling plan would be too complicated to be given here in detail.

The analysis is based upon interpreting paragraph 27 to mean that 5 retest panels will be selected for each of the originally selected sample panels which is rejected in accordance with the first sentence of paragraph 27. Assume random selection of sample panels from the shipment. Assume further for a moment that the sample panel is evaluated in a completely reproducible manner by the applicable tests. Then the exact operating characteristics of the sampling plan are as outlined in table 2. The table indicates that under the above assumptions (i) a shipment in which less than 3 percent of the panels were rejectable would almost always be accepted; (ii) shipments in

which from 13 percent (in the case of 10 original sample panels) to 20 percent (in the case of 5) of the panels were rejectable would be accepted about half the time; and (iii) 40 percent of the panels in a shipment represented by 5 original sample panels would have to be rejectable to assure the rejection of the entire shipment.

TABLE 2.—Operating characteristics of the acceptance sampling plan

Probability of accepting the shipment without reinspection	True proportion of rejectable ^a panels in the shipment	
	Using 5 original sample panels	Using 10 original sample panels
0.95	Percent 5	Percent 3
.50	20	13
.10	40	27

^a As determined by criterion in par. 27.

Additional complications enter when it is taken into consideration that each sample panel is not evaluated in a completely reproducible manner by the tests and that there is some uncertainty in the classification of the panel as rejectable or not rejectable. In general, the result of this uncertainty will be to decrease the probability of acceptance of a shipment with a low true proportion of rejectable panels (say less than 5 percent) and to increase slightly (or leave unchanged) the probability of acceptance if the true proportion of rejectable panels is high (say about 25 percent).

ACCEPTANCE OF COMMERCIAL STANDARD

If acceptance has not previously been filed, this sheet properly filled in, signed, and returned will provide for the recording of your organization as an acceptor of this commercial standard.

Date -----

Commodity Standards Division,
National Bureau of Standards,
Washington 25, D. C.

Gentlemen:

We believe that the Commercial Standard CS45-47 constitutes a useful standard of practice, and we individually plan to utilize it as far as practicable in the

production¹ distribution¹ purchase¹ testing¹
of Douglas fir plywood.

We reserve the right to depart from it as we deem advisable.

We understand, of course, that only those articles which actually comply with the standard in all respects can be identified or labeled as conforming thereto.

Signature of
Authorized Officer -----
(in ink)

(Kindly typewrite or print the following lines)

Name and title
of above officer -----

Organization -----
(Fill in exactly as it should be listed)

Street address -----

City, Zone, and State -----

¹ Underscore which one. Please see that separate acceptances are filed for all subsidiary companies and affiliates which should be listed separately as acceptors. In the case of related interests, trade associations, trade papers, etc., desiring to record their general support, the words "General support" should be added after the signature.

TO THE ACCEPTOR

The following statements answer the usual questions arising in connection with the acceptance and its significance:

1. *Enforcement.*—Commercial standards are commodity specifications voluntarily established by mutual consent of those concerned. They present a common basis of understanding between the producer, distributor, and consumer and should not be confused with any plan of governmental regulation or control. The United States Department of Commerce has no regulatory power in the enforcement of their provisions, but since they represent the will of the interested groups as a whole, their provisions through usage soon become established as trade customs, and are made effective through incorporation into sales contracts by means of labels, invoices, and the like.

2. *The acceptor's responsibility.*—The purpose of commercial standards is to establish for specific commodities, nationally recognized grades or consumer criteria and the benefits therefrom will be measurable in direct proportion to their general recognition and actual use. Instances will occur when it may be necessary to deviate from the standard and the signing of an acceptance does not preclude such departures; however, such signature indicates an intention to follow the commercial standard where practicable, in the production, distribution, or consumption of the article in question.

3. *The Department's responsibility.*—The major function performed by the Department of Commerce in the voluntary establishment of commercial standards on a Nation-wide basis is fourfold; first, to act as an unbiased coordinator to bring all interested parties together for the mutually satisfactory adjustment of trade standards; second, to supply such assistance and advice as past experience with similar programs may suggest; third, to canvass and record the extent of acceptance and adherence to the standard on the part of producers, distributors, and users, and fourth, after acceptance, to publish and promulgate the standard for the information and guidance of buyers and sellers of the commodity.

4. *Announcement and promulgation.*—When the standard has been endorsed by a satisfactory majority of production or consumption in the absence of active valid opposition, the success of the project is announced. If, however, in the opinion of the Standing Committee of the Department of Commerce, the support of any standard is inadequate, the right is reserved to withhold promulgation and publication.

ACCEPTORS

52. The organizations listed below have individually accepted these grading rules for use as far as practicable in the production, distribution, testing, or purchase of Douglas fir plywood. In accepting the standard they reserved the right to depart therefrom as they individually deem advisable. It is expected that articles which actually comply with the requirements of this standard in all respects will be regularly identified or labeled as conforming thereto, and that purchasers will require such specific evidence of conformity.

ASSOCIATIONS
(General Support)

American Institute of Architects, Kansas City Chapter, Kansas City, Mo.
American Specification Institute, Chicago, Ill.
Arizona Retail Lumber & Builders Supply Association, Phoenix, Ariz.
Building Officials Conference of America, Inc., Washington, D. C.
Carolina Lumber & Building Supply Association, Charlotte, N. C.
Consumers Cooperative Association, Kansas City, Mo.
Dairymen's League Co-operative Association, Inc., New York, N. Y.
Douglas Fir Plywood Association, Tacoma, Wash.
Hardwood Plywood Institute, Chicago, Ill.
Mississippi Retail Lumber Dealers Association, Inc., Jackson, Miss.
National Hardwood Lumber Association, Chicago, Ill.
New Jersey Lumbermen's Association, Newark, N. J.
Prefabricated Home Manufacturers' Institute, Washington, D. C.
Southern California Retail Lumber Association, Los Angeles, Calif.
Southern Hardwood Producers, Inc., Memphis, Tenn.
Veneer Association, The, Chicago, Ill.
West Coast Lumbermen's Association, Portland, Oreg.
Wisconsin Retail Lumbermen's Association, Milwaukee, Wis.

FIRMS

A B E L, Inc., Seattle, Wash.
ACF-Brill Motors Co., Philadelphia, Pa.
Acme Door Co., Hoquiam, Wash.
Adams, Franklin O., Tampa, Fla.
Adams Lumber Co., Inc., The George, Inwood, Long Island, N. Y.
Addison-Rudesal, Inc., Atlanta, Ga.
Aetna Plywood & Veneer Co., Chicago, Ill.
Albany-Plylock Div. (M & M Wood Working Co.) Albany, Oreg.
Albany Plywood Co., Albany, N. Y.
Algoma Plywood & Veneer Co., Algoma, Wis.
Allen, George W., La Porte, Ind.
Allentown Prefabricators, Allentown, Pa.
American Hardware Co., Inc., Petersburg, Va.
American Plywood Corp., New London, Wis.
American Seating Co., Grand Rapids, Mich.
Anacortes Veneer, Inc., Anacortes, Wash.
Andrews, Jones, Biscoe & Goodell, Boston, Mass.
Andrews Lumber Co., C. E., New Bethlehem, Pa.
Anson & Gilkey Co., Merrill, Wis.
Arizona Sash, Door & Glass Co., Phoenix, Ariz., and Tucson, Ariz.
Armstrong Landon Co., The, Kokomo, Ind.
Arrington Lumber, Norfolk, Va.
Ashton Co., C. J., Detroit, Mich.
Associated Plywood Mills, Inc., Eugene, Oreg.
Atlantic Plywood Co., Inc., New York, N. Y.
Bailey & Ailing Lumber Co., Newark, N. J.
Bakelite Corp., New York, N. Y.
Bakelite Corp., Bloomfield, N. J. (General support.)
Baldridge Lumber Co., J. C., Albuquerque, N. Mex.
Baltimore, City of, Bureau of Building Construction, Baltimore, Md.

Barger Millwork Co., Statesville, N. C.
Baris Lumber Co., J. C., New York, N. Y.
Barnes Lumber Co., W. F. & J. F., Waco, Tex.
Baumer, Herbert, Columbus, Ohio.
Baxter & Co., C. B., Kansas City, Mo.
Beasley & Sons Co., Nashville, Tenn.
Becker Co., Henry A., West Orange, N. J.
Beeson, Carroll O., Crawfordsville, Ind.
Belli Co., Trenton, N. J.
Bellingham Plywood Corp., South Bellingham, Wash.
Bellman, Gillett & Richards, Toledo, Ohio.
Bennett-Bailey Lumber Co., Minneapolis, Minn.
Berger, F. E., R. L. Kelley and Associates, Champaign, Ill.
Besch Co., The Carl, New York, N. Y.
Binswanger & Co., Inc., Richmond, Va.
Bishop, Horatio W., La Mesa, Calif.
Blackburn, Inc., Robert, Milwaukee, Wis.
Blackstock Lumber Co., Seattle, Wash.
Boehm, George A., New York, N. Y.
Boeing Airplane Co., Wichita Division, Wichita, Kans.
Borcharding Co., W. C., Indianapolis, Ind.
Bosman & Casson, Inc., Harrison, N. J.
Botsford Lumber Co., Winona, Minn.
Brazer, Clarence W., New York, N. Y.
Bridge Tables & Novelties, Inc., Lowell, Mass.
Brittain & Cannon Co., Watertown, Mass.
Brooks-Borg, Des Moines, Iowa.
Clay Brown & Co., Portland, Oreg.
Bruett Lumber, Inc., T. A., Milwaukee, Wis.
Brust & Brust, Milwaukee, Wis. (General support.)
Buckley Door Co., F. S., San Francisco, Calif.
Bucky, Fred W., Jr., Jacksonville, Fla.
Buell & Co., Dallas, Tex.
Buffalo Plywood Corp., Buffalo, N. Y.
Buffelin Lumber & Manufacturing Co., Tacoma, Wash.
Builders Supply Co., Bismarck, N. Dak., and Fargo, N. Dak.
Burket, Harold E., Ventura, Calif.
Burnside Veneer Co., Inc., Burnside, Ky.
Burrow Lumber Co., Canyon, Tex.
California Builders Supply Co., Oakland, Calif.
California Door Co., The, Los Angeles, Calif.
California Panel & Veneer Co., Los Angeles, Calif.
Cameron & Co., Inc., Wm., Waco, Tex.
Cameron Lumber Co., Inc., Newburgh, N. Y.
Camlet, J. Thomas, Passaic, N. J.
Camp Plywood Co., Inc., E. W., Indianapolis, Ind.
Canada, Forest Products Laboratories of, Ottawa, Ontario, Canada.
Candela, Rosario, New York, N. Y.
Cannon & Mullen, Salt Lake City, Utah.
Capitol City Lumber Co., The, Hartford, Conn.
Carr, Adams & Collier Co., Dubuque, Iowa.
Cascades Plywood Corp., Portland, Oreg.
Casein Co. of America, Seattle, Wash.
Cedarquist Show Case & Cabinet Co., Los Angeles, Calif.
Cellarius, Chas. F., Cincinnati, Ohio.
Central Glazing Co., Fort Worth, Tex.
Central Wholesale Co., Inc., Shreveport, La.
Chapin, Rollin C., Minneapolis, Minn. (General support.)
Chapin Lumber Co., The, Aurora, Colo.
Charlottesville Lumber, Inc., Charlottesville, Va.
Chicago & Riverdale Lumber Co., Chicago, Ill.
Chicago Trim & Plywood Co., Chicago, Ill.
Christmann Veneer & Lumber Co., St. Louis, Mo.

- Churchill Cabinet Co., Chicago, Ill.
 Chrysler Corp., Detroit, Mich.
 Cincinnati Butchers Supply Co., The, Cincinnati, Ohio.
 Clark, Carl W., Cortland, N. Y.
 Cleary Millwork Co., Inc., Ansonia, Conn.
 Coffin, Ralph V., Seattle, Wash.
 Cogswell Construction Co., The, Baltimore, Md.
 Cole Manufacturing Co., Memphis, Tenn.
 Concrete Grid Forms, Berkeley, Calif.
 Conwell & Co., E. L., Philadelphia, Pa.
 Coolerator Co., Duluth, Minn.
 Coolidge, Shepley, Bulfinch & Abbott, Boston, Mass.
 Coos Bay Lumber Co., Coos Bay, Oreg.
 Cottonwood Lumber Co., Cottonwood, Ariz.
 Cram & Ferguson, Boston, Mass.
 Cresmer Manufacturing Co., Riverside, Calif.
 Crompton & Knowles Loom Works, Worcester, Mass.
 Crook & Co., Inc., Chicago, Ill.
 Crowell & Lancaster, Bangor, Maine.
 Curran Bros., Pomona, Calif.
 Curtis Co's., Inc., Clinton Iowa.
 Curtis Co., Inc., Ros, Detroit, Mich.
 Cuyahoga Lumber Co., Cleveland, Ohio.
 Dakota Sash & Door Co., Aberdeen, S. D.
 Dascomb-Daniels Lumber Co., Kansas City, Mo.
 Davidson Sash & Door Co., Austin, Tex.
 Davidson Sash & Door Co., Inc., Lake Charles, La.
 Davis Hardwood Co., San Francisco, Calif.
 Davis Plywood Corp., Cleveland, Ohio.
 Deats Sash & Door Co., Los Angeles, Calif.
 DeJarnette, Charles Wagner, Des Moines, Iowa.
 DeLuxe Metal Furniture Co., Warren, Pa.
 Delmarva Sash & Door Co., Philadelphia.
 Diamond Hill Plywood Co., Inc., Darlington, S. C.
 Dibble Lumber Co., The S. B., North Adams, Mass.
 District of Columbia, Government of, Office of Municipal Architect, Engineer Department, Washington, D. C.
 Dix Lumber Co., North Cambridge, Mass.
 Donlin Co., The, St. Cloud, Minn.
 Dover Lumber Co., Dover, N. J.
 Downes Lumber Co., Boston, Mass.
 Duncan Laboratories, Portland, Oreg.
 Durez Plastics & Chemicals, Inc., North Tonawanda, N. Y.
 Dyke Bros., North Little Rock, Ark.
 Dykes Lumber Co., New York, N. Y.
 East Bay Refrigerator & Fixture Co., Oakland, Calif.
 East Coast Lumber & Supply Co., Fort Pierce, Fla.
 Eastern Plywood & Door Co., Inc., Jamestown, N. Y.
 Eastwood Lumber Co., Providence, R. I.
 Edison Wood Products, Inc., New London, Wis.
 Eggers Plywood & Veneer Co., F., Two Rivers, Wis.
 Eller Lumber Co., Edward, Pittsburgh, Pa.
 Elizabeth Lumber Co., Elizabeth, N. J.
 Elliott Bay Lumber Co., Seattle, Wash.
 Elliott Bay Mill Co., Seattle, Wash.
 Emery Industries, Inc., Cincinnati, Ohio.
 Empire Millwork Corp., Corona, N. Y.
 Empire Sash & Door Co., Ltd., The, Winnipeg, Manitoba, Canada.
 Engineering Systems, Inc., Chicago, Ill.
 English, Miller & Hockett, Hutchinson, Kans.
 Evans-MacArthur Co., New York, N. Y.
 Evansville Sash & Door Co., Inc., Evansville, Ind.
 Everett & Associates, H. F., Allentown, Pa.
 Exchange Lumber & Manufacturing Co., Spokane, Wash.
 Fairchild Aircraft Corp., Hagerstown, Md.
 Fairchild Engine & Airplane Corp., Duramold Division, Jamestown, N. Y.
 Farley & Loetscher Manufacturing Co., Dubuque, Iowa.
 Farnham Co., H. F., Portland, Maine.
 Fessenden Hall, Philadelphia, Pa.
 Fischer & Co., Inc., Charles F., New York, N. Y.
 Flannagan, Eric G., Henderson, N. C.
 Flint Sash & Door Co., Inc., Flint, Mich.
 Florence Manufacturing Co., Inglewood, Calif.
 Ford, Inc., Ivon R., McDonough, N. Y.
 Forest Products Corp., Fort Lauderdale, Fla.
 Fort Wayne Builders Supply Co., Fort Wayne, Ind.
 Frost Hardwood Lumber Co., San Diego, Calif.
 Fuller & Co., W. P., Sacramento, Calif., and Portland, Oreg.
 Fuller Goodman Co., Oshkosh, Wis.
 Furer, Wm. C., Honolulu, T. H.
 Gaines Hardwood Lumber Co., St. Louis, Mo.
 Gale Manufacturing Co., Albion, Mich.
 Garratt & Co., Wayne, Pa.
 General Box Co., Chicago, Ill.
 General Electric Co., Schenectady, N. Y.
 General Millwork Corp., Utica, N. Y.
 General Motors Corp., Frigidaire Division, Dayton, Ohio.
 General Paint Corp., Spokane, Wash.
 Georgeson, F. T., Eureka, Calif.
 Georgia Hardwood Lumber Co., Augusta, Ga.
 Glaize & Bro., Winchester, Va.
 Globe-Wernicke Co., The, Norwood, Ohio.
 Godfrey Lumber Co., Boston, Mass.
 Goshen Sash & Door Co., Goshen, Ind.
 Grand Rapids Store Equipment Co., Grand Rapids, Mich.
 Great Lakes Sash & Door Co., The, Cleveland, Ohio.
 Greater New York Lumber Industries, Inc., New York, N. Y. (General support.)
 Green Gable Builders, Cedar Rapids, Iowa.
 Greene & Wood, Inc., New Bedford, Mass.
 Gretsche Manufacturing Co., Fred, Brooklyn, N. Y.
 Groffmann, L. C., St. Louis, Mo. (General support.)
 Gurvitch Lumber Co., Inc., E., Chicopee, Mass.
 Hahn, Stanley W., Cleveland, Ohio.
 Haley Bros., Santa Monica, Calif.
 Hannaford & Sons, Samuel, Cincinnati, Ohio.
 Hansen Lumber Co., Ltd., The, Quebec City, Canada.
 Haralson & Mott, Fort Smith, Ark.
 Harbor Plywood Corp. of California, San Francisco, Calif.
 Harbor Plywood Corp., Hoquiam, Wash., and Jacksonville, Fla.
 Harbor Plywood Corp., Chicago Division, Chicago, Ill.
 Harbor Sales Co., Inc., The, Baltimore, Md., and Washington, D. C.
 Hardwood Plywood Distributors, Inc., Baltimore, Md.
 Hartung, F. L., Seattle, Wash.
 Haskellite Manufacturing Corp., Grand Rapids, Mich.
 Hasness, C. D., Harrisburg, Pa.
 Hastings & Co., Inc., A. W., Somerville, Mass.
 Havre Builders Supply Co., Havre, Mont.
 Hawkins Lumber & Warehouse Co., Boston, Mass.
 Haxby, Bissell & Belair, Minneapolis, Minn.
 Heidritter Lumber Corp., Elizabeth, N. J.
 Henrich Plywood Co., Inc., Buffalo, N. Y.
 Higgins Lumber Co., J. E., San Francisco, Calif.
 Hill Plywoods, Lyman, Hollywood, Calif.
 Hodgdon, Charles, San Gabriel, Calif.
 Hodgson Co., E. F., Division of Allied-Hodgson Housing Corp., Boston, Mass.
 Hoffman Co., Earl, Los Angeles, Calif.
 Hoffmann Lumber Co., Pittsburgh, Pa.
 Hogan Lumber Co., Oakland, Calif.
 Hoke, Karl B., Toledo, Ohio.
 Holsman, Holsman & Klekamp, Chicago, Ill.
 Hope, Frank L., Jr., San Diego, Calif.
 Houston Sash & Door Co., Houston, Tex.
 Howell, Leslie D., Portland, Oreg. (General support.)
 Huber-Lancetot Housewrecking Corp., Buffalo, N. Y.
 Humboldt Plywood Corp., Portland, Oreg.
 Hunter Lumber Co., Chillicothe, Ill.
 Hunting Lumber Co., R. D., Cedar Rapids, Iowa.
 Huss Lumber Co., Chicago, Ill.
 Huttig Sash & Door Co., Jacksonville, Fla., St. Louis, Mo., and Roanoke, Va.
 Illinois, University of, Department of Architecture, Urbana Champaign, Ill. (General support.)
 Industrial Wholesale Lumber Co., Cleveland, Ohio.
 Interstate Sash & Door Co., The, Canton, Ohio.
 Iron City Sash & Door Co., Pittsburgh, Pa.
 Iron Mountain, City of, City Lumber Yard, Iron Mountain, Mich.
 Ivey, Inc., Edwin J., Seattle, Wash.
 Jacksonville Sash & Door Co., Jacksonville, Fla.

- Jamestown Veneer & Plywood Corp., Jamestown, N. Y.
- Jones Hardwood Co., San Francisco, Calif.
- Karpen & Bros., S., Chicago, Ill.
- Keely Plywood Co., Hal, Pittsburgh, Pa.
- Keich & O'Brien, Warren, Ohio.
- Keith & Son, L. J., Fairfield, Ill.
- Kellogg & Sons Co., Chas. C., Utica, N. Y.
- Kennedy Lumber Co., Trenton, N. J.
- Kilham, Hopkins & Greeley, Boston, Mass.
- Kimball Lumber Co., Watertown, Mass.
- Kimball & Wilson, Inc., Detroit, Mich.
- Kochton Plywood & Veneer Co., Inc., Chicago, Ill.
- Kohn, Robert D., & Chas. Butler, Architects Associated, New York, N. Y.
- Krauss Bros. Lumber Co. of Florida, Tampa, Fla.
- Kyle, Herbert S., Charleston, W. Va. (General support).
- Lambert Lumber Co., Leavenworth, Kans.
- Law, Law, Potter & Nystrom, Madison, Wis.
- Lee, W. H., Philadelphia, Pa.
- Leidighan & Havens Lumber Co., Saline, Kans.
- Levy, Will, St. Louis, Mo.
- Lewis Lumber Co., Spring Lake, N. J.
- Liberty Lumber & Manufacturing Co., Inc., Erwin, Tenn.
- Limback Lumber Co., Cedar Rapids, Iowa.
- Lingo Lumber Co., Dallas, Tex.
- Little, W. A., Washington, Pa.
- Loeb, Laurence M., White Plains, N. Y.
- Loftus Corp., Peter F., Pittsburgh, Pa. (General support.)
- Logan Lumber Co., Tampa, Fla.
- Loizeaux Lumber Co., J. D., Plainfield, N. J.
- Lemasney & Co., J. F., Los Angeles, Calif.
- Long-Bell Lumber Co., The, Longview, Wash.
- Lord & Bushnell Lumber Co., Chicago, Ill.
- Los Angeles, City of, Los Angeles, Calif.
- Lowatt, George I., Philadelphia, Pa.
- Lumber & Builder Supply Co., Spencer, W. Va.
- Lumber & Millwork Co., The, Philadelphia, Pa.
- Lumber Products, Inc., Portland, Oreg.
- Lumbermen's Supply, Inc., Sacramento, Calif.
- Lundgren Dealers Supply, Inc., Tacoma, Wash.
- Lyman-Hawkins Lumber Co., The, Akron, Ohio.
- Lyon Metal Products, Inc., Aurora, Ill.
- M & M Plywood Corp. (division of M & M Wood Working Co.), Portland, Oreg.
- M & M Wood Working Co., Portland, Oreg.
- MacLea Lumber Co., The, Baltimore, Md.
- Mann & Co., Hutchinson, Kans.
- Markland Contracting Co., M. B., Atlantic City, N. J.
- Marsh & Truman Lumber Co., Chicago, Ill.
- Marshall Wright Lumber Co., Ionia, Mich.
- Martin, Edgar, Chicago, Ill.
- Martin Co., The Glenn L., Baltimore, Md.
- Martin Lumber Co., Springfield, Mass.
- Mason City Millwork Co., Mason City, Iowa.
- Mason & Co., George D., Detroit, Mich.
- Mason Lumber Co., Jacksonville, Fla.
- Massey Concrete Products Co., Chicago, Ill.
- Mauran, Russell, Crowell & Mullgardt, St. Louis, Mo.
- McCoy & Co., Inc., Lawrence R., Worcester, Mass.
- McCray Refrigerator Co., Kendallville, Ind.
- McGowin-Lyons Hardware & Supply Co., Mobile, Ala.
- McGuinn Lumber Co., Inc., N. J., Charlotte, N. C.
- McPhillips Manufacturing Co., Inc., Mobile, Ala.
- Mears Plywood & Millwork Corp., Baltimore, Md.
- Merrill-Scheef Lumber Co., Pierre, S. Dak.
- Merritt Lumber Yards, Inc., Reading, Pa.
- Michigan Wholesalers, Inc., Jackson, Mich.
- Midland Building Industries, Inc., Indianapolis, Ind.
- Mid-West Lumber Co., The, Mankato, Kans.
- Midwest Lumber Co., Dubuque, Iowa.
- Miles Lumber & Coal Co., H. W., Livingston, Mont.
- Miller & Vrydagh, Terre Haute, Ind.
- Mills Industries, Inc., Chicago, Ill.
- Milwaukee Plywood Co., Milwaukee, Wis.
- Minot Builders Supply Co., Minot, N. Dak.
- Modcraft Co., Inc., The, Brooklyn, N. Y., and Muncy, Pa.
- Modern Woodwork Co., Milwaukee, Wis.
- Moore, C. A., Central City, Ky.
- Moore & Co., Le Mars, Iowa.
- Moore Dry Dock Co., Oakland, Calif.
- Moore Lumber Co., L. A., Mason City, Iowa.
- Mooser, William, San Francisco, Calif.
- Morrill & Sturgeon Lumber Co., Portland, Oreg.
- Morrison-Merrill & Co., Salt Lake City, Utah.
- Mowry & Co., Inc., Geo., Derry, Pa.
- Muhlenberg Bros., Reading, Pa.
- Nachtegall Manufacturing Co., Grand Rapids, Mich.
- National Plywood Co., New York, N. Y.
- National Plywoods, Inc., Chicago, Ill.
- National Woodworks, Inc., Birmingham, Ala.
- Neal-Blum Co., Savannah, Ga.
- Nelson, Albert L., St. Louis, Mo.
- New England Panel Co., Everett, Mass.
- New Orleans, Housing Authority of, New Orleans, La.
- New Rochelle Coal & Lumber Co., New Rochelle, N. Y.
- New York Wood Working Corp., Flushing, N. Y.
- Newton Lumber & Manufacturing Co., The, Colorado Springs, Colo.
- Niagara Plywood Co., Buffalo, N. Y.
- Nicolai Plywood Co., Garibaldi, Oreg.
- Northwest Door Co., Tacoma, Wash.
- Northwest Procurement & Sales, Portland, Oreg.
- Northwestern Furniture Co., Milwaukee, Wis.
- Norwood Sash & Door Manufacturing Co., Norwood, Ohio.
- Nurenburg, W. S., Fort Worth, Tex.
- O & N Lumber Co., Menomonee, Wis.
- Oakland Public Schools, Oakland, Calif.
- Officer, Gwynn, Lafayette, Calif.
- Ohio City Sash & Door Co., Dayton, Ohio.
- Oklahoma Sash & Door Co., The, Oklahoma City, Okla.
- Omaha Hardwood Lumber Co., Omaha, Nebr.
- Oregon Plywood Corp., Sweet Home, Oreg.
- Oregon, State of, Salem, Oreg.
- Oregon-Washington Plywood Co., Tacoma, Wash.
- Ostlund & Johnson, San Francisco, Calif.
- Owens-Parks Lumber Co., Los Angeles, Calif.
- Pacific Manufacturing Co., Santa Clara, Calif.
- Pacific Mutual Door Co., Chicago, Ill.
- Patten-Blinn Lumber Co., Los Angeles, Calif.
- Patterson-Buck Hardwood Co., Dearborn, Mich.
- Pease Woodwork Co., Cincinnati, Ohio.
- Pehrson & Associates, G. A., Spokane, Wash.
- Peninsula Plywood Corp., Port Angeles, Wash.
- Pepper, George W., Jr., Philadelphia, Pa.
- Pettit, Oman, Meinhardt & Cleland, Columbus, Ohio.
- Plunkett-Webster Lumber Co., Inc., Pluster Plywood Division, New York, N. Y.
- Plylock Corp., The (Division of M & M Wood Working Co.), Portland, Oreg.
- Plywood Distributing Co., Chicago, Ill.
- Plywood & Hardwood Lumber Dealers, San Francisco, Calif.
- Plywoods Plastics Corp., Hampton, S. C.
- Portsmouth Lumber Corp., Portsmouth, Va.
- Puget Sound Plywood, Inc., Tacoma, Wash.
- Queensborough Lumber Co., Inc., Bayside, N. Y.
- Radford & Sanders, Inc., Baltimore, Md.
- Ramsey & Sons, Inc., A. H., Miami, Fla.
- Ream Co., George E., Los Angeles, Calif.
- Reeb Millwork Corp., Roselle, N. J.
- Reichhold Chemicals, Inc., Phenolic Plastics Division, Detroit, Mich. (General support.)
- Reid, William H., Jr., Billings, Mont.
- Reliable Box & Lumber Co., Port Newark, N. J.
- Reo Motors, Inc., Lansing, Mich.
- Reynolds Lumber Co., New London, Ohio.
- Rhodes, Harry A., Rensselaer, N. Y. (General support.)
- Richards & Davis Co., Fall River, Mass.
- Richardson-Phelps Lumber Co., Grinnell, Iowa.
- Rieck & Fleece Builders Supplies, Inc., St. Petersburg, Fla.
- Ripley-Hopping, Inc. (successors to David Ripley & Sons-W. Frank Hopping), Newark, N. J.
- Risser Lumber & Manufacturing Co., Art, Paris, Ill.
- Ritchie & Associates, James H., Boston, Mass.
- Robbins Door & Sash Co., Scranton, Pa., and other cities.
- Robert & Co., Inc., Atlanta, Ga.
- Robinson Lumber & Coal Co., Robinson, Ill.

- Robinson Manufacturing Co., Everett, Wash.
 Rochester, City of, Board of Education, Rochester, N. Y.
 Rock Island Millwork Co., Rock Island, Ill.
 Rockwell Bros. & Co., Houston, Tex.
 Roddis Co., Chicago, Ill.
 Roddis Lumber & Veneer Co. of Missouri, Kansas City, Mo., Dallas, Tex., and San Antonio, Tex.
 Roddis Panel & Door Co., Louisville, Ky.
 Roddis Plywood & Door Co., Inc., Cambridge, Mass.
 Rohrer Lumber Co., D. J., Clintonville, Wis.
 Rolfe Building Materials Co., New Brunswick, N. J.
 Rudinger, Inc., C. R., South Kearny, N. J.
 Ruggles Lumber Co., Carlos, Springfield, Mass.
 Ruse & Co., Baltimore, Md.
 Rust Sash & Door Co., Kansas City, Mo.
 St. Paul & Tacoma Lumber Co., Tacoma, Wash.
 St. Paul & Tacoma Lumber Co., Plywood Division, Olympia, Wash.
 Schilbe Lumber Co., The, Tamaqua, Pa.
 Schoeneman Bros. Co., Hawarden, Iowa.
 Schuette Co., William, Pittsburgh, Pa.
 Seranton Plywood Co., Forty Fort, Pa.
 Segelke & Kohlhaus Co., La Crosse, Wis.
 Shappert Engineering Co., Belvidere, Ill.
 Shaver, Charles W. & John A., Salina, Kans.
 Shenk Co., Henry, Erie, Pa.
 Shutze & Armistead, Atlanta, Ga.
 Sierra Mill & Lumber Co., Sacramento, Calif.
 Simons, Inc., Minneapolis, Minn.
 Simons Lumber Co., Henry, Minneapolis, Minn.
 Simpson Logging Co., Seattle, Wash.
 Sirrine & Co., J. E., Greenville, S. C.
 Sleeper, Harold R., New York, N. Y.
 Smith Co., Allen A., Toledo, Ohio.
 Snell Sash & Door Co., St. Paul, Minn.
 Snook-Veith Lumber Co., The, Cincinnati, Ohio.
 Solie Lumber Co., Janesville, Wis.
 Sothman Co., The, Grand Island, Nebr.
 Southern Counties Gas Co., Los Angeles, Calif.
 Southwestern Sash & Door Co., Albuquerque, N. Mex.
 Southwestern Sash & Door Co., Joplin, Mo.
 Special Materials Corp., Oakland, Calif.
 Specification Record, Chicago, Ill.
 Spokane Sash & Door Co., Spokane, Wash.
 Spokane Woodworking Co., Spokane, Wash.
 Springfield Plywood Corp., Springfield, Oreg.
 Standard Cabinet Works, Inc., Los Angeles, Calif.
 Standard Door & Lumber Co., Inc., Fort Worth, Tex.
 Standard Store Equipment Co., Inc., Seattle, Wash.
 Stanton & Son, Inc., E. J., Los Angeles, Calif.
 Stark & Co., Inc., Kansas City, Mo.
 Steele & Hibbard Lumber Co., St. Louis, Mo.
 Steele, Sandham & Steele, Omaha, Nebr.
 Sterling Lumber & Investment Co., The, Denver, Colo.
 Stillwater Manufacturing Co., The, Stillwater, Minn.
 Stoetzel, Ralph E., Chicago, Ill.
 Stokes & Allyn, Portland, Oreg.
 Strable Hardwood Co., Oakland, Calif.
 Stravs, Carl B., Minneapolis, Minn.
 Streeter, D. D., Brooklyn, N. Y.
 Strong & Hale Lumber Co., The, Portland, Conn.
 Sutliff Co., Milan R., Oshkosh, Wis.
 Swan Lake Moulding Co., Klamath Falls, Oreg.
 Sweet's Catalog Service, New York, N. Y. (General support.)
 Sweetwater Sash & Door Co., Sweetwater, Tex.
 Synvar Corp., Wilmington, Del.
 Syracuse University, Syracuse, N. Y.
 Taylor, Ellery Kirke, Haddonfield, N. J.
 Taylor, Ellis Wing, Los Angeles, Calif.
 Taylor Sash & Door Co., Pensacola, Fla.
 Teachout Sash, Door & Glass Co., Detroit, Mich.
 Texas Technological College, Department of Architecture, Lubbock, Tex. (General support.)
 Thompson & Lichtner Co., Inc., The, Brookline, Mass.
 Thorne, Henry Calder, Ithaca, N. Y.
 Travis, Applegate Co., Grand Rapids, Mich.
 Throop-Martin Co., The, Columbus, Ohio.
 Toombs & Co., Springfield, Mo.
 Trexler Lumber Co., Allentown, Pa.
 Trojan Cupboard Co., Burbank, Calif.
 Twin City Hardwood Lumber Co., St. Paul, Minn.
 Umpqua Plywood Corp., Roseburg, Oreg.
 Underwood Coal & Supply Co., Mobile, Ala.
 Underwood Veneer Co., Wausau, Wis.
 United States Plywood Corp., New York, N. Y., and Seattle, Wash.
 Unity Lumber Co., Inc., Brooklyn, N. Y.
 Van Arsdale-Harris Co., San Francisco, Calif.
 Vancouver Plywood & Veneer Co., Vancouver, Wash.
 Vaughan & Sons, Geo. C., Houston, Tex.
 Virginia Polytechnic Institute, Department of Architecture, Blacksburg, Va.
 Vogel, Willis A., Toledo, Ohio.
 Waddell Co., Inc., The, Greenfield, Ohio.
 Walsh, Louis A., Waterbury, Conn.
 Walton Plywood Co., Everett, Wash.
 Wanke Panel Co., Portland, Oreg.
 Ware & McClenahan, Salt Lake City, Utah.
 Washington Veneer Co., Olympia, Wash., and Fort Worth, Tex.
 Washington Woodworking Co., Inc., Washington, D. C.
 Watertown Sash & Door Co., Watertown, S. Dak.
 Weber Veneer & Plywood Co., Shawano, Wis. (General support.)
 Weinert Lumber Co., Columbia, Ill.
 Welch, Carroll E., Huntington, N. Y.
 West Coast Plywood Co., Aberdeen, Wash.
 Western Electric Co., Inc., New York, N. Y.
 Western Hardwood Lumber Co., Los Angeles, Calif.
 Western Union Telegraph Co., The, New York, N. Y.
 Weston Basket & Barrel Plant of Pacific States Box & Basket Co., San Francisco, Calif.
 Weyerhaeuser Sales Co., Tacoma, Wash.
 Wheeler, Osgood Co., The, Tacoma, Wash.
 Wheelock, Inc., E. U., Los Angeles, Calif.
 Whissel Lumber Co., Inc., L. N., Buffalo, N. Y.
 White River Lumber Co., Enumclaw, Wash.
 Wholesale Building Supply, Inc., Oakland, Calif.
 Wholesale Distributing Co., Pittsburgh, Pa.
 Wilbur Lumber Co., West Allis, Wis.
 Willatsen, Andrew, Seattle, Wash.
 Williams & Hunting Co., Cedar Rapids, Iowa.
 Wilson & Sons, Inc., W. A., Wheeling, W. Va.
 Willson, Fred F., Bozeman, Mont.
 Wimberly & Thomas Hardware Co., Inc., Birmingham, Ala.
 Windber Lumber Co., Windber, Pa.
 Winde, McCormick & Chapin, Inc., Charlestown, Mass.
 Winner Manufacturing Co., Inc., Trenton, N. J.
 Wolverine Shingle & Lumber Co., Detroit, Mich.
 Wood Lumber Co., Birmingham, Ala.
 Wood Lumber Co., E. K., Los Angeles, Calif., and Oakland, Calif.
 Wood-Ply Research Foundation, Inc., Chicago, Ill. (General support.)
 Woolley, W. P., Portland, Oreg. (General support.)
 Wright & Wright, Detroit, Mich. (General support.)
 Young Service Bureau, John F., Merrill, Wis.
 Youngstown Plywood Co., Youngstown, Ohio.
 Zenith Radio Corp., Chicago, Ill.

UNITED STATES GOVERNMENT

- Federal Housing Administration, Washington, D. C. (General support.)
 Federal Public Housing Authority, Washington, D. C.
 Interior, Department of The, Office of Indian Affairs, Chicago, Ill.
 Justice, Department of, Bureau of Prisons, Construction Division, Washington, D. C.
 National Housing Agency, Office of the Administrator, Washington, D. C.
 Naval Air Training Bases, Pensacola, Fla.
 Naval Shipyard, Portsmouth, N. H.
 Public Buildings Administration, Federal Works Agency, Washington, D. C. (General support.)
 Treasury Department, Bureau of Engraving & Printing, Washington, D. C.
 Veteran's Administration, Washington, D. C.
 War Department, Washington, D. C.

COMMERCIAL STANDARDS

CS No.	Item	CS No.	Item
0-40.	Commercial standards and their value to business (third edition).	56-41.	Oak flooring (second edition).
1-42.	Clinical thermometers (third edition).	57-40.	Book cloths, buckrams, and impregnated fabrics for bookbinding purposes except library bindings (second edition).
2-30.	Mopsticks.	58-36.	Woven elastic fabrics for use in overalls (overall elastic webbing).
3-40.	Stoddard solvent (third edition).	59-44.	Textiles—testing and reporting (fourth edition).
4-29.	Staple porcelain (all-clay) plumbing fixtures.	60-36.	Hardwood dimension lumber.
5-46.	Pipe nipples; brass, copper, steel, and wrought-iron (second edition).	61-37.	Wood-slat venetian blinds.
6-31.	Wrought-iron pipe nipples (second edition). Superseded by CS5-46.	62-38.	Colors for kitchen accessories.
7-29.	Standard weight malleable iron or steel screwed unions.	63-38.	Colors for bathroom accessories.
8-41.	Gage blanks (third edition).	64-37.	Walnut veneers.
9-33.	Builders' template hardware (second edition).	65-43.	Methods of analysis and of reporting fiber composition of textile products (second edition).
10-29.	Brass pipe nipples. Superseded by CS5-46.	66-38.	Marking of articles made wholly or in part of platinum.
11-41.	Moisture regains of cotton yarns (second edition).	67-38.	Marking articles made of karat gold.
12-40.	Fuel oils (fifth edition).	68-38.	Liquid hypochlorite disinfectant, deodorant, and germicide.
13-44.	Dress patterns (fourth edition).	69-38.	Pine oil disinfectant.
14-43.	Boys' button-on waists, shirts, junior and sport shirts (made from woven fabrics) (third edition).	70-41.	Phenolic disinfectant (emulsifying type) (second edition) (published with CS71-41).
15-46.	Men's pajama sizes (made from woven fabrics) (third edition).	71-41.	Phenolic disinfectant (soluble type) (second edition) (published with CS70-41).
16-29.	Wall paper.	72-38.	Household insecticide (liquid spray type).
17-47.	Diamond core drill fittings (fourth edition).	73-45.	Old growth Douglas fir standard stock doors (third edition).
18-29.	Hickory golf shafts.	74-39.	Solid hardwood wall paneling.
19-32.	Foundry patterns of wood (second edition).	75-42.	Automatic mechanical draft oil burners designed for domestic installations (second edition).
20-47.	Staple vitreous china plumbing fixtures (fourth edition).	76-39.	Hardwood interior trim and molding.
21-39.	Interchangeable ground-glass joints, stopcocks, and stoppers (fourth edition).	77-40.	Sanitary cast-iron enameled ware.
22-40.	Builders' hardware (non-template) (second edition).	78-40.	Ground-and-polished lenses for sun glasses (second edition) (published with CS79-40).
23-30.	Feldspar.	79-40.	Blown, drawn, and dropped lenses for sun glasses (second edition) (published with CS78-40).
24-43.	Screw threads and tap-drill sizes.	80-41.	Electric direction signal systems other than semaphore type for commercial and other vehicles subject to special motor vehicle laws (after market).
25-30.	Special screw threads. Superseded by CS24-43.	81-41.	Adverse-weather lamps for vehicles (after market).
26-30.	Aromatic red cedar closet lining.	82-41.	Inner-controlled spotlamps for vehicles (after market).
27-36.	Mirrors (second edition).	83-41.	Clearance, marker, and identification lamps for vehicles (after market).
28-46.	Cotton fabric tents, tarpaulins and covers (second edition).	84-41.	Electric tail lamps for vehicles (after market).
29-31.	Staple seats for water-closet bowls.	85-41.	Electric license-plate lamps for vehicles (after market).
30-31.	Colors for sanitary ware.	86-41.	Electric stop lamps for vehicles (after market).
31-38.	Wood shingles (fourth edition).	87-41.	Red electric warning lanterns.
32-31.	Cotton cloth for rubber and pyroxylin coating.	88-41.	Liquid-burning flares.
33-43.	Knit underwear (exclusive of rayon) (second edition).	89-40.	Hardwood stair treads and risers.
34-31.	Bag, case, and strap leather.	90- .	(Reserved for power shovels and cranes).
35-47.	Hardwood plywood (third edition).	91-41.	Factory-fitted Douglas fir entrance doors.
36-33.	Fourdrinier wire cloth (second edition).	92-41.	Cedar, cypress and redwood tank stock lumber.
37-31.	Steel bone plates and screws.	93-41.	Portable electric drills (exclusive of high frequency).
38-32.	Hospital rubber sheeting.	94-41.	Calking lead.
39-37.	Wool and part wool blankets (second edition). (Withdrawn as commercial standard, July 14, 1941.)	95-41.	Lead pipe.
40-32.	Surgeons' rubber gloves.	96-41.	Lead traps and bends.
41-32.	Surgeons' latex gloves.	97-42.	Electric supplementary driving and passing lamps for vehicles (after market).
42-43.	Structural fiber insulating board (third edition).	98-42.	Artists' oil paints.
43-32.	Grading of sulphonated oils.	99-42.	Gas floor furnaces—gravity circulating type.
44-32.	Apple wraps.	100-44.	Porcelain-enameled steel utensils (second edition).
45-47.	Douglas fir plywood (seventh edition).	101-43.	Flue-connected oil-burning space heaters equipped with vaporizing pot-type burners.
46-40.	Hosiery lengths and sizes (third edition).	102- .	(Reserved for Diesel and fuel-oil engines.)
47-34.	Marking of gold-filled and rolled-gold-plate articles other than watchcases.	103-42.	Cotton and rayon velour (jacquard and plain).
48-40.	Domestic burners for Pennsylvania anthracite (underfeed type) (second edition).	104-46.	Warm-air furnaces equipped with vaporizing pot-type oil burners (second edition).
49-34.	Chip board, laminated chip board, and miscellaneous boards for bookbinding purposes.		
50-34.	Binders board for bookbinding and other purposes.		
51-35.	Marking articles made of silver in combination with gold.		
52-35.	Mohair pile fabrics (100-percent mohair plain velvet, 100-percent mohair plain frieze, and 50-percent mohair plain frieze).		
53-35.	Colors and finishes for cast stone.		
54-35.	Mattresses for hospitals.		
55-35.	Mattresses for institutions.		

CS No.	Item	CS No.	Item
105-43.	Mineral wool; loose granulated, or felted form, in low-temperature installations.	123-45.	Grading of diamond powder.
106-44.	Boys' pajama sizes (woven fabrics) (second edition).	(E) 124-45. ¹	Master disks.
107-45.	Commercial electric-refrigeration condensing units (second edition).	125-45.	Prefabricated homes.
108-43.	Treading automobile and truck tires.	126-45.	Tank mounted air compressors.
109-44.	Solid-fuel-burning forced-air furnaces.	127-45.	Self-contained mechanically refrigerated drinking water coolers.
110-43.	Tire repairs—vulcanized (passenger, truck, and bus tires).	128-45.	Men's sport shirt sizes—woven fabrics (other than those marked with regular neckband sizes).
111-43.	Earthenware (vitreous-glazed) plumbing fixtures.	129-47.	Materials for safety wearing apparel (second edition).
112-43.	Homogeneous fiber wallboard.	130-46.	Color materials for art education in schools.
113-44.	Oil-burning floor furnaces equipped with vaporizing pot-type burners.	131-46.	Industrial mineral wool products, all types—testing and reporting.
114-43.	Hospital sheeting for mattress protection.	132-46.	Hardware cloth.
115-44.	Porcelain-enameled tanks for domestic use.	133-46.	Woven wire netting.
116-44.	Bituminized-fibre drain and sewer pipe.	134-46.	Cast aluminum cooking utensils (metal composition).
117-44.	Mineral wool; blankets, blocks, insulating cement, and pipe insulation for heated industrial equipment.	135-46.	Men's shirt sizes (exclusive of work shirts).
118-44.	Marking of jewelry and novelties of silver.	136-46.	Blankets for hospitals (wool, and wool and cotton).
(E) 119-45. ¹	Dial indicators (for linear measurements).	137-46.	Size measurements for men's and boys' shorts (woven fabrics).
120-46.	Standard stock ponderosa pine doors (second edition).	138-47.	Insect wire screening.
121-45.	Women's slip sizes (woven fabrics).	139-47.	Work gloves.
122-45.	Western hemlock plywood.	140-47.	Convectors: testing and rating.
		141-47.	Sine bars, blocks, plates, and fixtures.

NOTICE.—Those interested in commercial standards with a view toward accepting them as a basis of everyday practice may secure copies of the above standards, while the supply lasts, by addressing the Commodity Standards Division, National Bureau of Standards, Washington, 25 D. C.

¹ Where "(E)" precedes the CS number, it indicates an emergency commercial standard, drafted under war conditions with a view toward early revision.